

a strong or weak solution of this electrolyte showed the same phenomena.¹ By diluting the solution still further, a fluid could be obtained in which the iron was, after the first effect, permanently but feebly positive. On allowing time, however, it was found that in all such cases black sulphuret formed here and there on the iron. Rusted iron was negative to platinum (1037) in this very weak solution, which by direct chemical action could render metallic iron positive.

831. In all the preceding experiments the electrolyte used has been the sulphuret of potassium solution; but I now changed this for another, very different in its nature, namely, the *green nitrous acid* (804), which has already been shown to be an excellent conductor of electricity. Iron and platinum were the metals employed, both being in the form of wires. The vessel in which they were immersed was a tube like that formerly described (803); in other respects the arrangement was the same in principle as those already used (812, 824). The first effect was the production of a current, the iron being positive in the acid to the platinum; but this *quickly ceased*, and the galvanometer-needle came to 0°. In this state, however, the circuit could not in all things be compared with the one having the solution of sulphuret of potassium for its electrolyte (812); for although it could conduct the thermo current of antimony and bismuth in a certain degree, yet that degree was very small compared to the power possessed by the former arrangement, or to that of a circle in which the nitrous acid was between two platinum plates (804). This remarkable retardation is consequent upon the assumption by the iron of that peculiar state which Schcenbein has so well described and illustrated by his numerous experiments and investigations. But though it must be admitted that the iron in contact with the acid is in a peculiar state (939, 989, 1021), yet it is also evident that a circuit consisting of platinum, iron, and nitrous acid, does not cause a current though it have sufficient conducting power to carry a thermo current.

832. But if the contact of platinum and iron has an electro-motive force, why does it not produce a current? The application of heat (818), or of a little chemical action (819) at the

place of contact, does produce a current, and in the latter case

¹ Care was taken in these and the former similar cases to discharge the platinum surface of any reacting force it might acquire from the action of the previous current, by separating it from the other metals, and touching it in the liquid for an instant with another platinum, plate.